

Ministry of Higher Education

and Scientific Research

University of Diyala

College of Medicine



Association between placental location and the adverse pregnancy outcomes

**Submitted to the Council of the College of Medicine, Diyala University, In
Partial Fulfillment of Requirements for the Bachelor Degree in medicine and
general surgery.**

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2022-2023

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

﴿ يَرْفَعِ اللّٰهُ الَّذِیْنَ اٰمَنُوْا مِنْكُمْ وَالَّذِیْنَ اٰتَوْا الْعِلْمَ دَرَجٰتٍ ﴾

صدق اللہ العلی العظیم

(سورة المجادلة / ایتة ۱۱)

الإهداء

إلى الحب إلى الهدوء إلى العدل إلى الأمل
إلى من كان رفيق دربنا حتى وإن تعثرنا
إلى النور المحمدي إلى الشجاع العلو
إلى الحنان الفاطمي إلى الثأر الحسيني
إلى الحب الهاشمي إلى حامل عطر الجنة
إلى نور الله على الأرض إلى قائم آل محمد
إلى حضرة جناب الموقر صاحب الزمان)

سلام عليك..

إلى أمي وأبي

أن إنتاجي ما هو إلا تربيتكم
أنتم وهبتموني القلم فشكراً .

شكر وتقدير

تتوارى كلمات الثناء خجلاً تقديراً لعطائك
ومجهوداتك التي كبرت وتسامت بفضل الله ثم بتعاونك
جزيل الشكر والإمتنان لك
الاستاذة الدكتورة : رعد كامل سعدي
هنيئاً لنا بك وهنيئاً لك روعه العطاء

Abstract

The placenta serves as an important medium between the mother and the fetus for transmitting metabolic, endocrine, and other vital functions. It is also a vital source of information about the intrauterine environment and may provide clues about events culminating in adverse pregnancy outcomes. In our study we will discuss the impact of placental location on adverse pregnancy outcomes.

Patients and methods: This is cross sectional descriptive study. A sample of 200 pregnant women was collected from Al-batool teaching hospital in the period from July 2022 to December 2022. The informations was collected through prepared written questionnaire by direct face to face interview. The questions included the maternal age, gestational age, parity, gravida, incidence of preeclampsia, birth weight, neonatal care unit admission and etc.

Results and conclusion: 200 women were enrolled in this study with mean age of 27 years . We found association between the placental location and adverse pregnancy outcomes (prematurity, low birth weight and SGA babies).

Keywords: placenta, placental location, pregnancy outcomes.

Introduction

The placenta serves as an important medium between the mother and the fetus for transmitting metabolic, endocrine, and other vital functions. It is also a vital source of information about the intrauterine environment and may provide clues about events culminating in adverse pregnancy outcomes. Previous reports shown a correlation between placenta location, blood supply, and pregnancy outcomes, with placenta related disorders documented as one of the major causes of maternal and perinatal morbidity and mortality. In spite of these reports, the mechanism of placental-related disorders has not been fully understood. However, inadequate trophoblastic invasion from abnormal placentation has been implicated in some of these cases [1].

Uterine blood supply is not uniformly distributed. The site of implantation and resultant location of the placenta within the uterus are likely important determinants of placental blood flow and therefore pregnancy success [2]. There has been extensive research on low placental implantation because of the importance of detecting placenta previa. Only a few studies have been undertaken on other aspects of placental position and possible impact on pregnancy outcome. These studies reported that placental location might have implications for poor pregnancy outcome including preterm birth, small for gestational age (SGA), foetal malposition, malpresentation and the development of pre-eclampsia. In theory, lateral placental location could contribute a higher risk of foetal intrauterine growth retardation (IUGR) [3,4]. A case-control trial conducted in the USA revealed that women with their placenta located in the fundus carry an increased risk of premature rupture of membranes with all the consequential adverse sequelae [5].

Placental tissue over or near the internal cervical os after 20 weeks of pregnancy—a condition called placenta previa (PP)—is observed at a rate of

approximately 1 in 200–390 pregnancies. This obstetric complication is associated with high risks for maternal hemorrhage and emergency peripartum hysterectomy as a life-saving measure [6].

Among surviving infants, high rates of prematurity, high associated morbidity, and low birth weight have been reported [4]. Several studies have tried to determine the potential risk factors contributing to the development of PP. Multiparity, advanced maternal age, cigarette smoking, male sex of the fetus, previous cesarean delivery, history of abortions or uterine surgical procedures, cocaine use, and PP in a previous pregnancy are some of these factors. Nevertheless, the etiology of PP remains obscure [7,8].

During the course of clinical treatment of placenta previa, obstetricians should be aware of not only the types of placenta previa (complete and partial or marginal placenta previa) but also the position of placental attachment (e.g., anterior uterine wall, posterior wall, whether the placenta overlaps a surgical scar from a previous caesarean section). Some researchers have suggested that complete placenta previa, which is characterized by placental attachment to the anterior wall covering the uterine scar, should be defined as pernicious placenta previa. Previous studies have suggested that placenta previa is often a risk factor for placenta accreta. Placenta accreta spectrum (PAS) is the latest term used to describe placenta accreta, increta, and percreta [9].

Aim of study

To identify the relationship between placental location and the adverse pregnancy outcomes in women attending Al-Batool teaching hospital.

Patients and methods

This is cross sectional descriptive study. A sample of 200 pregnant women was collected from Al-batool teaching hospital in the period from July 2022 to February 2023. The study included women with a singleton pregnancy complicated by 1 of 4 types of Placental location: Complete PP (placenta totally covering the cervical os), anterior location, posterior location and low-lying placenta (placenta located near the internal os, up to 2 cm away). Placental location was diagnosed either at the time of delivery or after 20 weeks of pregnancy by both clinical and ultrasound criteria (transabdominal and transvaginal approach). Women with second trimester PP whose pregnancy ended in a termination before 20 weeks and those with a multiple pregnancy were excluded from the analysis. The informations was collected through prepared written questionnaire by direct face to face interview. The questions included the maternal age, gestational age, parity, gravida, incidence of preeclampsia, birth weight, neonatal care unit admission and etc. the privacy and confidentiality of the patients were preserved.

Statistical backage of social sciences (SPSS) version 25 was used to analyze the data. We expressed the qualitative data frequencies and the quantitative data by arithmetic mean and standard deviation. Chi-square test was used to identify the association between the variables when $P < 0.05$ considered significant.

Results

200 women were enrolled in this survey. Their mean age was 27.11 ± 7.34 years, their mean weight was 73.8 ± 14.09 KG and their mean height was 163.15 ± 32.72 cm. their placental location is demonstrated in table 1.

Table 1. Placental location

	Frequency	Percent%
Anterior wall	66	33.0
Posterior wall	60	30.0
Fundal	24	12.0
low-lying placenta previa	39	19.5
True placenta previa	11	5.5
Total	200	100.0

Their parity and previous cesarean section operations demonstrated in table 2.

Table 2. Parity * Number of C/S

		Number of C/S							Total
		Zero	1.00	2.00	3.00	4.00	5.00	6.00	
Parity	Primiparous	34	30	0	0	0	0	0	64
	Multiparous	17	24	50	23	14	7	1	136
Total		51	54	50	23	14	7	1	200

There was no association between the position of placenta and the risk of pre-eclampsia as in table 3.

Table 3.

Placental location	Pre-eclampsia		Total	Significance
	Yes	No		
Anterior wall	5	61	66	P= 0.625
Posterior wall	4	56	60	
Fundal	1	23	24	
low-lying placenta previa	0	39	39	
True placenta previa	2	9	11	
Total	10	190	200	

We found strong association between the placental location and the maturity of the babies at delivery as in table 4.

Table 4.

Placental location	Maturity at delivery		Total	Significance
	Term	Preterm		
Anterior wall	53	13	66	P < 0.001
Posterior wall	56	4	60	
Fundal	19	5	24	
low-lying placenta previa	15	24	39	
True placenta previa	7	4	11	
Total	150	50	200	

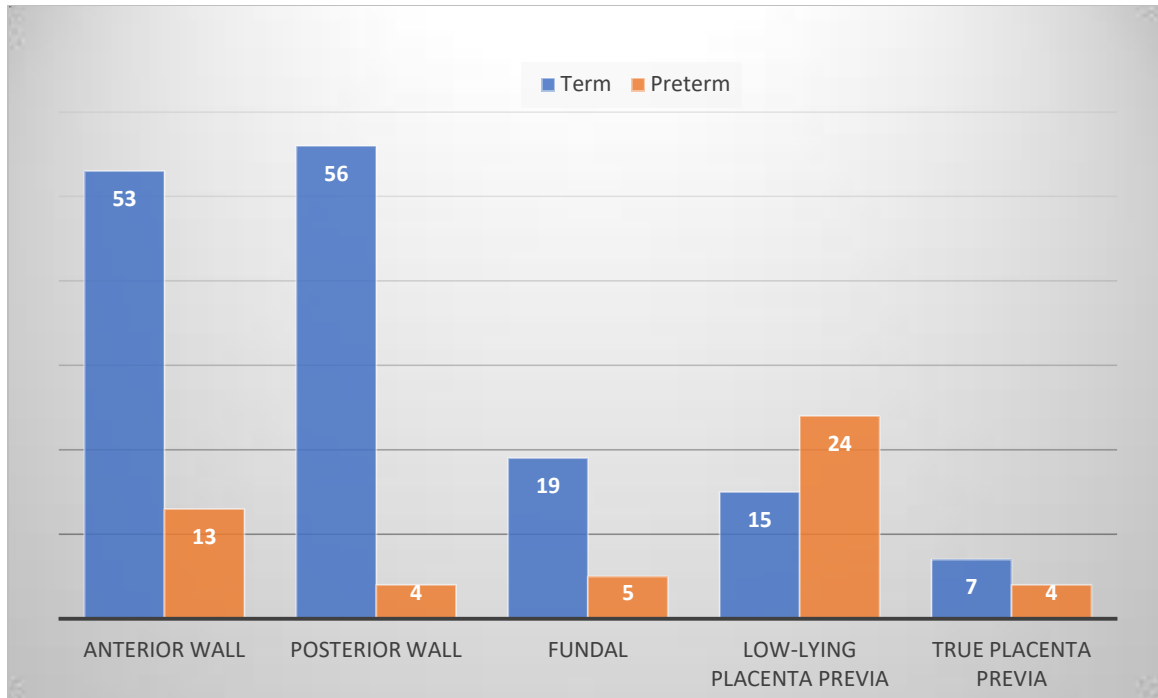


Figure 1. association between placental location and maturity

The mean birthweight was 2810.61 ± 437.94 grams and there were strong negative correlation between the placental location and the birth weight ($P < 0.01$).

There were no association between the placental location and risk of neonatal care unit admission as in table 5.

Table 5

Placental location	Admission to NCU		Total	Significance
	Yes	No		
Anterior wall	20	46	66	P = 0.138
Posterior wall	17	43	60	
Fundal	10	14	24	
low-lying placenta previa	22	17	39	
True placenta previa	9	2	11	
Total	78	122	200	

There were association between the size of the baby and the placental location as in table 6.

Table 6

Placental location	Small for gestational age		Total	Significance
	Yes	No		
Anterior wall	12	54	66	P < 0.001
Posterior wall	5	55	60	
Fundal	5	19	24	
low-lying placenta previa	28	11	39	
True placenta previa	8	3	11	
Total	58	142	200	

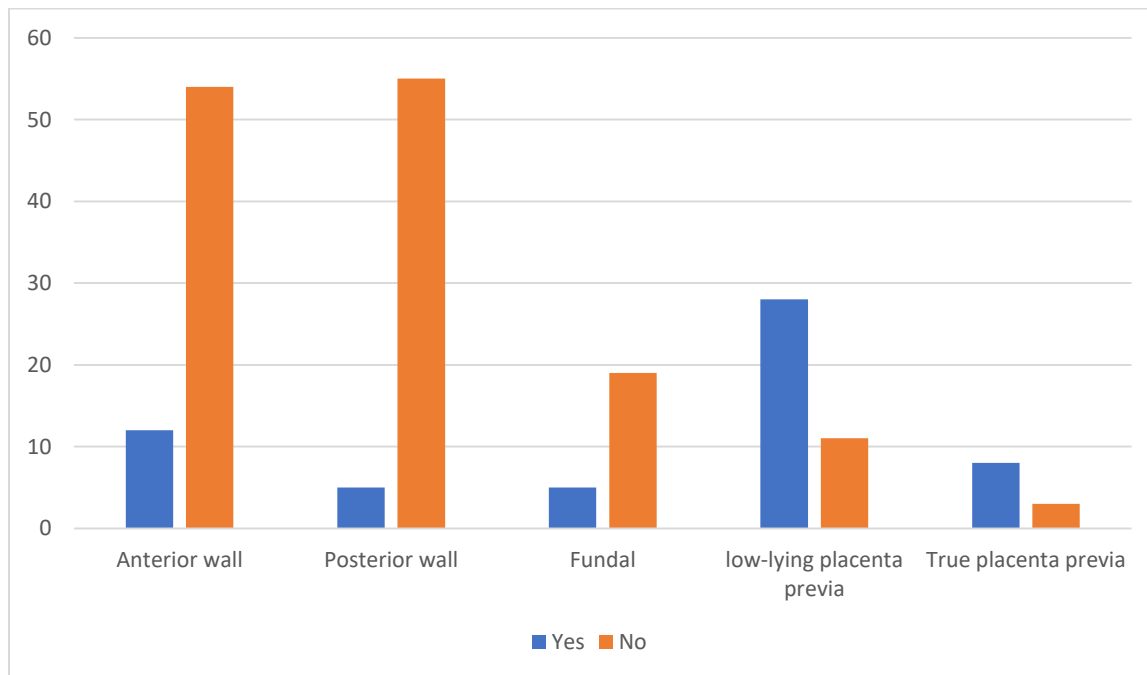


Figure 2. association between placental location and the size of the baby

Discussion

The incidence of true PP in the present study was 2.0%, compared with an incidence of 0.4%–0.5% reported in the literature [10]. However, there are also 2 previous studies that reported incidences of 1.9% [11] and 1.3% [12]. Such variation could be explained by differences in the definition of PP, the inclusion criteria used, and the demographics of the populations being studied [12]. The high incidence of PP in the present study population could be explained by the high number of referrals to the study hospital, which is a center for high risk pregnancies.

In our study, we found association between placental location and the maturity of the baby ($P < 0.001$) which is consistent with other studies on women with placenta previa. However, clinical courses widely vary with each patient. Some patients necessitate preterm cesarean section and hysterectomy for life-threatening hemorrhage, whereas others undergo elective cesarean section at term without hemorrhagic complication [13,14].

We found strong negative correlation between the placental location and the birth weight and this is consistent with the Fung et al [15] study.

The babies in our study tend to small for the gestational age compared to other babies born with normal placenta location ($P < 0.001$) which agree with the findings of Räsänen et al [16] who found that placenta previa was not a risk factor for SGA in nulliparous women, but was associated with a two-fold increased prevalence of SGA in multiparous women. Of the increased prevalence of SGA associated with placenta previa in multiparous women [16].

More vessels are involved in anterior placentation than in posterior placentation; therefore, surgical incisions resulting in rupture of blood vessels can

cause increased bleeding in the former case. Previous studies have found that placenta previa is associated with a greater risk of postpartum hemorrhage when the placenta is located on the anterior wall of the uterus [16].

The main limitation of the study was the little number of the sample and the little number of US reports about the placental location.

Conclusion

We can consider the placental attachment site in placenta has a major influence on the pregnancy outcome. We should be aware of the potential for postpartum hemorrhage in cases of placenta previa where the placenta is attached to the anterior wall of the uterus. Because the adverse outcomes of patients with placenta previa are mainly related to the amount of bleeding, uterine contractions should be inhibited to reduce antepartum hemorrhage and to prolong the gestational age of the fetus.

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